




RECEIVED

JAN 15 2003

We claim:

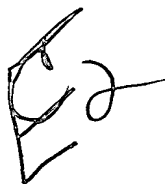
TC 1700 MAIL ROOM

- 
1. (Amended thrice) A method of reducing the sulfur content of a catalytically cracked liquid petroleum fraction, which comprises catalytically cracking a petroleum feed fraction containing organosulfur compounds at elevated temperature in the presence of an equilibrium cracking catalyst and a product sulfur reduction catalyst which comprises a porous molecular sieve having (i) a first metal component which is within the interior pore structure of the molecular sieve and which comprises vanadium in an oxidation state greater than zero and (ii) a second metal component which is within the interior pore structure of the molecular sieve and which comprises at least one rare earth to produce liquid cracking products of reduced sulfur content.
 2. (Amended) A method according to claim 1 in which the product sulfur reduction catalyst comprises a large pore size or intermediate pore size or intermediate pore size zeolite as the molecular sieve component.
 3. A method according to claim 2 in which the large pore size zeolite comprises zeolite USY.
 4. Canceled.
 5. A method according to claim 2 in which the second metal component comprises lanthanum alone or in combination with cerium.
 6. A method according to claim 1 in which the second metal component is present in an amount from 1 to 10 weight percent of the catalytic composition.
 7. A method according to claim 1 in which the product sulfur reduction catalyst comprises a USY zeolite having a UCS of from 2.420 to 2.455 nm, a bulk

silica:alumina ratio of at least 5.0 as the molecular sieve component and, as the first metal component, vanadium in an oxidation state greater than zero and, as the second metal component, a combination of lanthanum and cerium.

8. A method according to claim 1 in which the sulfur reduction catalyst is a separate particle additive catalyst.
-

9. (Amended thrice) In a fluid catalytic cracking process in which a heavy hydrocarbon feed comprising organosulfur compounds is catalytically cracking to lighter products by contact in a cyclic catalyst recirculation cracking process with a circulating fluidizable catalytic cracking catalyst inventory consisting of particles having a size ranging from about 20 to about 100 microns, comprising:
- (i) catalytically cracking the feed in a catalytic cracking zone operating at catalytic cracking conditions by contacting feed with a source of equilibrium cracking catalyst to produce a cracking zone effluent comprising cracked products and spent catalyst containing coke and strippable hydrocarbons;
 - (ii) discharging and separating the effluent mixture into a cracked product rich vapor phase and a solids rich phase comprising spent catalyst ;
 - (iii) removing the vapor phase as a product a fractionating the vapor to form liquid cracking products including gasoline.
 - (iv) Stripping the solids rich spent catalyst phase to remove occluded hydrocarbons from the catalyst.
 - (v) transporting stripped catalyst from the stripper to a catalyst regenerator;
 - (vi) regenerating stripped catalyst by contact with oxygen containing gas to produce regenerated catalyst; and
 - (vii) recycling the equilibrium catalyst to the cracking zone to contact further quantities of heavy hydrocarbon feed.
- the improvement which comprises reducing the sulfur content of a the



gasoline portion of the liquid cracking products, by catalytically cracking the feed fraction at elevated temperature in the presence of an equilibrium catalyst and a product sulfur reduction catalyst which comprises a porous molecular sieve having product sulfur reduction catalyst which comprises a porous molecular sieve having (i) a first metal component which is within the interior pore structure of the molecular sieve and which comprises vanadium in an oxidation state greater than zero and (ii) a second metal component which is within the interior pore structure of the molecular sieve and which comprises at least one rare earth.

10. A method according to claim 9 in which the cracking catalyst comprises a matrixed faujasite zeolite.
11. A method according to claim 10 in which the product sulfur reduction catalyst comprises a large pore size or intermediate pore size zeolite as the molecular sieve component and a combination of cerium and at least one other rare earth metal as the second metal component.
12. A method according to claim 9 in which the large pore size zeolite of the product sulfur reduction catalyst comprises zeolite USY.
13. Canceled.
14. Canceled.
15. Canceled.
16. Canceled.
17. Canceled.

18. Canceled.

19. Canceled.

20. Canceled.

21. Canceled.

22. Canceled.

23. Canceled.

24. Canceled.

25. Canceled.

26. (Newly-Added) A method according to claim 1 in which the second metal component is in a matrix which comprises at least one metal selected from the group consisting of alumina, silica-alumina, clay and mixtures thereof.

27. (Newly-Added) A method according to claim 9 in which the second metal component is in a matrix which comprises at least one metal selected from the group consisting of alumina, silica-alumina, clay and mixtures thereof.
